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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/721,457	11/20/2000	Christoph Stahl	4028	4924

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EXAMINER
MILLER, MARTIN E

ART UNIT	PAPER NUMBER
2623	

DATE MAILED: 09/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/721,457	STAHL ET AL.	
	Examiner	Art Unit	
	Martin Miller	2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-9 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-9 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8 and 9 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Germany on November 20, 1999. It is noted, however, that applicant has not filed a certified copy of the Germany 199 55 919.8 application as required by 35 U.S.C. 119(b).

Information Disclosure Statement

2. The examiner has considered the IDS filed March 28, 2001 and May 14, 2003 and an initialed copy of each is included with this office action.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1- 3, 6, 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murray et al., (hereinafter Murray), US 6597800, and Lawrence et al., (hereinafter Lawrence), US 6038337.

As per claim 1, Murray teaches:

(a) roughly classifying (10) pixel points of said received images whether or not a pixel point is relevant for said object recognition to provide relevant (part of the object) pixel points and eliminate irrelevant pixel points (col. 4, ll. 22-43);

(b) forming a reduced image (11) based on said relevant pixel points as roughly classified in step (a) (col. 4, ll. 27-30);

(c) filtering (20) each reduced image (11) for forming at least two corresponding decomposed or filtered images (21, 22, 23) (binary mask, col. 4, ll. 30-33 and Sobel filter, col. 4, ll. 37-40) whereby image components relevant for said object recognition (object pixels (binary mask), object boundary (Sobel filter)) are retained in said filtered images;

(d) further classifying (30) said filtered images for providing classified images, wherein said further classifying is performed by a group or ensemble of different classifiers (classifier 10 and 22, Fig. 1) which operate in accordance with learned rules to allocate said classified images to different object classes,

Murray does not specifically teach that his classifiers use a characterizing vector, however, Lawrence teaches:

wherein each of said classifiers operates based on a characterizing vector forming an input information for its respective classifier (col. 4, ll. 6-15);

Murray goes on to teach:

(e) merging or fusing (40) said classified images in accordance with an algorithm (col. 6, ll. 8-15) to form a combined global evaluation or decision for each class of said object classes, said global

evaluation or decision representing merged images (41A, 41B, 41C) (assessor unit, col. 5, l. 63-col.6, l. 15, see fig. 1); and

(f) deciding (50), on the basis of said merged images, whether a pixel point is relevant and if so to which of said object classes (C_1 or C_2) each relevant pixel point belongs (col. 6, ll. 15-18).

It would have been obvious to one of ordinary skill in the art to use the feature vector of Lawrence in the general feature extraction system of Murray to overcome the limitations of the prior art with regard to variations in scale, orientation, and illumination of the target image data versus the reference image data.

As per claim 2, Murray teaches:

providing a set of predetermined first criteria (greater homogeneity, col. 3, ll. 47-48) for performing said rough classifying step (a), and providing a second set of second predetermined (change of illumination intensity, col. 3, ll. 35-36) criteria for performing said filtering step (c).

As per claim 3, Murray does not teach forming characterizing vectors, however, Lawrence teaches:

further comprising acquiring vicinity (pixels around center pixel) image data representing a vicinity of a respective relevant pixel point of a corresponding filtered image, and forming said characterizing vector from said vicinity image data (col. 4, ll. 23-28). It would have been obvious to one of ordinary skill in the art to use the vicinity vectors of Lawrence in the feature extraction system of Murray because the vicinity vector data is partially invariant to variations in intensity of the image.

As per claim 6, Murray or Lawrence teach:

comprising using, as said group of different classifiers, a neural network (Murray, multi layer perceptron technique, col. 5, ll. 35-36, or Lawrence, figure 2, element 260, col. 3, l. 2, "self-organizing map neural network") capable of learning (Lawrence, col. 4, ll. 31-36, with regard to Muray it is well-known that multi layer perceptron can be trained) for performing said step of further classifying (30).

As per claim 9, Murray teaches:

representing recognized objects by pixel clusters (clustering is used in K-Nearest-Neighbor classification, col. 5, ll. 35-36) in an image (51) that represents a decision regarding said combined global evaluation while performing said deciding step (50) (assessor unit, col. 6, ll. 15-20, output 24, figure 1).

5. Claims 4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murray and Lawrence as applied to claims 1 above, and further in view of Hutchenson et al., (hereinafter Hutchenson), US 5465308.

As per claim 4, Murray does not teach weighting. But Lawrence teaches that the a weighting factor can be added to each pixel to compensate for some invariance prior to being sent to the neural network, but does not specifically address a weighting system for different classes. However, Hutchenson teaches:

comprising providing different weighting factors or evaluation numbers representing different classes of objects to be recognized (Rank vectors, col. 17, ll. 46-55), and assigning or allocating certain weighting factors or evaluation numbers of said different weighting factors to each relevant pixel point (each feature component (e.g pixel)) is thereby marking each relevant pixel point (as taught by Lawrence, col. 4, ll. 26-30) with regard to which of said different classes of objects the marked pixel point belongs.

As per claim 7, neither Murray nor Lawrence teach using the characterizing vectors to create rules for the neural network, however, Hutchenson teaches:

comprising selecting from relevant pixel points of said filtered images (21, 22, 23) characterizing or feature vectors representing features of said relevant pixel points of said

rough classifying (10) (input feature vectors, col. 18, ll. 22-25), and forming rules (changing weights, col. 18, ll. 26-30) for said neural network from said characterizing or feature vectors.

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murray and Lawrence as applied to claims 1 above, and further in view of Knecht et al., (hereinafter Knecht), US 4881270.

As per claim 5, neither Murray nor Lawrence teach the limitations of claim 5, however, Knecht teaches:

sorting said vicinity image data in a spiral pattern into a vector of features (although Knecht teaches using rows and columns (col. 5, ll. 11-20) this is merely a design choice on how to present the data in vector form) into a vector of coefficients, applying a rapid (fast) Fourier transform (col. 5, ll. 34-40) to said vector of coefficients to form transformation coefficients (col. 5, ll. 52-54), and forming said characterizing vectors of an absolute value of said transform coefficients (col. 5, l. 7-col. 6, l. 7).

It would have been obvious to one of ordinary skill in the art to use the absolute values of Fourier transform coefficients as taught by Knecht in the system of Murray and Lawrence because the well known Fourier power spectrum of the frequencies present in the image data are easily manipulated as shown in Knecht's figure 5.

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murray and Lawrence as applied to claims 1 above, and further in view of Wang et al. (hereinafter Wang), "Automatic Target recognition Using a Feature-Decomposition and Data-Decomposition Modular Neural Network".

As per claim 8, neither Murray nor Lawrence specifically teach using a statistical process for global evaluation, however, Wang teaches:

further comprising performing said merging step in accordance with a statistical process (fig. 8, summation for mixture of experts, p. 118, equations 16 and 17) for obtaining said global evaluation (final classification, p. 1118, col. 2 , and further comprising using in said statistical process information based at least on one of a type (page 1119, col. 2, ll. 5-11), position and content of said received images (1) to be evaluated.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following U.S. patent(s) refer(s) to target classification: Krogmann, 5247584, Hsu, 5640468, Duvoisin, III et al., 5835901, Holmberg, 5838816, Hyland et al., 5937078, Greenspan et al., 5956427, Sims et al., 6042050, Kamei, 6243492, Freeman et al., 6263103, Chen et al., 6393137, Chao et al., 6529614, Christian et al., 6556708.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin Miller whose telephone number is (703) 306-9134. The examiner can normally be reached on Monday-Friday, 9am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 308-6604. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

mem
9/10/2003

AMELIA M. AU
SUPERVISORY PATENT EXAMINER
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